

REMARKS

The enclosed is responsive to the Office Action mailed on January 8, 2009. At the time the Examiner mailed the Office Action claims 1-8 and 30-41 were pending. By way of the present response Applicant has amended claims no claims, no claims have been canceled, and no claims have been added. Applicant respectfully requests reconsideration of the present application and the allowance of all claims now presented.

Applicant teaches and claims in claims 1-8 and 30-41 a structure in which one or more conductor elements within a PCB are coated with a carbon-based cladding material. The carbon-based cladding material can modify “an electromagnetic field pattern about the element in a manner that reduces radiative coupling between the element and neighboring conductor structures within the PCB.” (pg. 2 of original application). The carbon-based cladding material can provide finite electrical resistances within the PCB, provide a significant reduction in propagation delay of signal lines, and reduce cross-talk related performance degradation. As a result, embodiments of the invention can allow signal lines on a PCB to be spaced more closely together, and transmit higher frequencies than would be possible with unclad lines. (page 3 of original application). In order to achieve these benefits the carbon-based cladding consists of a material having a high carbon concentration greater than 60 percent by weight. (page 4 of original application). In one disclosed embodiment the carbon concentration exceeds 99 percent by weight.

Accordingly, in view of the above discussion and in response to the Examiner’s comments on page 2 of the Office Action mailed January 8, 2009, Applicant submits that the original application indeed does describe the benefits of the carbon cladding having a carbon concentration greater than 60 percent by weight.

Claim Rejections - 35 U.S.C. § 103(a)

The Examiner has rejected claims 1-2, 4-5, 36-38, and 40 under 35 U.S.C. § 103(a) as being unpatentable over *Sandhu* (US Patent 6,084,302) in view of *Funkenbusch* (US Patent 5,108,597). The Examiner has rejected claims 30-35 under 35 U.S.C. § 103(a) as being unpatentable over *Noorily* (in the record) in view of *Funkenbusch*. The Examiner has rejected claims 3, 6-7, 39 and 41 under 35 U.S.C. § 103(a) as being unpatentable over *Sandhu* in view of *Funkenbusch* as applied to claims 1-2, 4-5 and 8 above, and further in view of *Noorily*.

I. Claims 1-8 and 36-41: The Examiner has not provided a *prima facie* showing of obviousness 35 U.S.C. § 103(a)

The key to supporting any rejection under 35 U.S.C. 103 is the clear articulation of the reason(s) why the claimed invention would have been obvious. The Supreme Court in *KSR International Co. v. Teleflex Inc.*, U.S. ___, ___, 82 USPQ2d 1385, 1396 (2007) noted that the analysis supporting a rejection under 35 U.S.C. 103 should be made explicit. The Federal circuit has stated that “rejections on obviousness cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning underpinning to support the legal conclusion of obviousness.” *In re Kahn*, 441, F.3d 977, 988 78 USPQ2d 1329, 1336 (Fed. Circ. 2006). See also *KSR*, 550 U.S. at ___, 82 USPQ2d at 1396 (quoting Federal Circuit statement with approval).

M.P.E.P. § 2142 Legal Concept of *Prima Facie* Obviousness

Applicant previously requested in the Amendment and Response mailed September 25, 2008 for the Examiner to make a submission as to whether the Examiner’s teaching, suggestion or motivation to **modify *Sandhu* in view of *Funkenbusch*** was to “provide improved shielding and resistance to copper diffusion in the device of *Sandhu*” or to “provide improved shielding and resistance to aqueous media of high pH in the device of *Sandhu*.”

In response to Applicant’s request, the Examiner states on page 7 of the Office Action mailed January 8, 2009 that *Sandhu* and *Funkenbusch* are in the **same field of having to do**

with substrates, and then suggests it would be obvious to modify the device of *Sandhu* in view of *Funkenbusch* “in order to provide an excellent shield and a high level resistance in the PCB.”

Applicant respectfully submits that Examiner’s comments directed to the same field having to do with substrates and providing excellent shield and high level resistance are not a clear articulation of the reasons why Applicant’s claimed invention would have allegedly been obvious. Additionally, Applicant respectfully submits that the Examiner has not articulated a teaching, suggestion, or motivation for the modification of *Sandhu* in view of *Funkenbusch* sufficient to provide a 35 U.S.C. 103(a) rejection. Should the Examiner continue to maintain the rejection, Applicant again requests the Examiner to fully address Applicant’s request in order to facilitate prosecution. To be clear, Applicant is requesting the Examiner clearly articulate the following:

1. **To what exactly** is the modification providing an excellent shield and high level of resistance?
2. **Where** is the Examiner drawing the teaching, suggestion, or motivation for the combination? Applicant respectfully points the Examiner to M.P.E.P. § 2143 for a list of exemplary rationales.

In view of the above comments Applicant respectfully submits that the Examiner has not provided a *prima facie* showing of obviousness under 35 U.S.C. § 103(a). Accordingly, Applicant respectfully requests the withdrawal of the rejections of claims 1-8 and 36-41.

II. Claims 1-8 and 36-41: One of ordinary skill in the art would not be motivated to modify *Sandhu* in view of *Funkenbusch* because *Sandhu* teaches away from the modification

It is Applicant's understanding *Sandhu* discloses a barrier layer cladding around copper interconnect lines. The barrier cladding portion 25 is preferentially formed on the copper interconnect lines through a combination of ion implantation of a metal and an anneal step in a gas atmosphere. For example, the gas can be a carbon containing gas in which the carbon atoms in the carbon containing gas react with the implanted metal within the copper interconnect lines 15. Col. 4, ll. 38-40. Of particular importance, is that one of ordinary skill in the art would understand that "carbides do not form on the interlevel dielectric oxide 10." Col. 5, ll. 22. See also FIG. 3. Thus, the carbides selectively do not form on the oxide 10.

It is Applicant's understanding that *Funkenbusch* discloses carbon clad zirconium oxide support particles. The carbon cladding is deposited onto the zirconium oxide support particles utilizing LPCVD. Col. 11, ll. 65 – Col. 14, ll.39. Thus, the carbon cladding forms on the oxide support particles.

Applicant respectfully points out that *Sandhu* discloses a selective formation of barrier cladding 25 on copper interconnect lines 15, but not on the dielectric oxide 10. To the contrary, the LPCVD process of *Funkenbusch* is not selective, and would form a carbon cladding on all surfaces in the chamber. **Since *Sandhu* teaches away from and otherwise discourages the nonselective formation of a cladding one of ordinary skill in the art would not be motivated to modify the cladding of *Sandhu* in view of the cladding as disclosed in *Funkenbusch*.**

Accordingly, Applicant respectfully requests the withdrawal of the rejection of claims 1-8 and 36-41 under 35 U.S.C. § 103(a).

III. Claims 30-35

The Examiner has rejected claims 30-35 under 35 U.S.C. § 103(a) as being unpatentable over *Noorily* in view of *Funkenbusch*.

As argued in detail on pages 11-13 of the Amendment and Response mailed September 25, 2008, Applicant submits the combination does not disclose each and every element of the invention as claimed in claims 30-35 which require a “**rigid** dielectric board.” To the contrary *Noorily* expressly describes a **flexible** electric cable assembly for used under carpet wiring systems. Additionally, Applicant argued there is no motivation to combine the references and no reasonable expectation of success for the combination.

Accordingly, Applicant respectfully requests the withdrawal of the rejection of claims 30-35 under 35 U.S.C. § 103(a). Should the Examiner continue to maintain the rejections, Applicant request the Examiner fully address the above argument in order to facilitate prosecution.

IV. Claims 32 and 37

Applicant teaches and claims in claims 32 and 37 a carbon concentration of “at least 99% by weight.” As argued in detail on pages 13-14 of the Amendment and Response mailed September 25, 2008, Applicant submits the combination does not disclose this concentration.

Accordingly, Applicant respectfully requests the withdrawal of the rejection of claims 32 and 37 under 35 U.S.C. § 103(a). Should the Examiner continue to maintain the rejections, Applicant request the Examiner fully address the above argument in order to facilitate prosecution.

V. Claim 32

Applicant teaches and claims in claim 32 a **rigid** dielectric board member having a carbon-based cover formed of at least **99% carbon** by weight.

It is Applicant's understanding *Noorily* expressly describes a **flexible** electric cable assembly for use under carpet wiring systems which includes an insulation layer 32 preferably made from a laminate of **polyester and polyvinylchloride**.

Applicant respectfully submits that there is no reasonable expectation of success in modifying the polyester and polyvinylchloride insulation layer 32 to be formed of at least 99% carbon by weight, and retain the necessary flexibility and insulative characteristics. Accordingly, Applicant requests the withdrawal of the rejection of claim 32 under 35 U.S.C. § 103(a).

Pursuant to 37 C.F.R. § 1.136(a)(3), applicant(s) hereby request and authorize the U.S. Patent and Trademark Office to (1) treat any concurrent or future reply that requires a petition for extension of time as incorporating a petition for extension of time for the appropriate length of time and (2) charge all required fees, including extension of time fees and fees under 37 C.F.R. §§ 1.16 and 1.17, to Deposit Account No. 02-2666.

Respectfully submitted,

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